

Multitenant Architecture: Securing Splunk To Combat Snooping Users

HELPnet Technology Services

A division of Indiana University Information Technology Services

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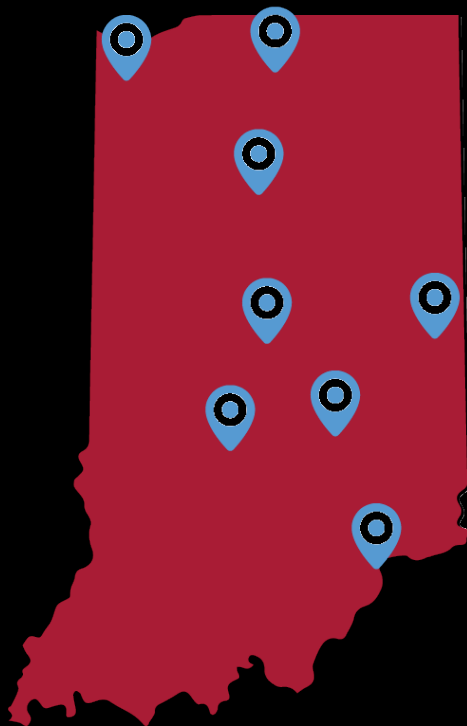
Introduction

Allen Tucker – Director HELPnet Technology Services

Daniel Daily – Splunk Architect HELPnet Technology Services

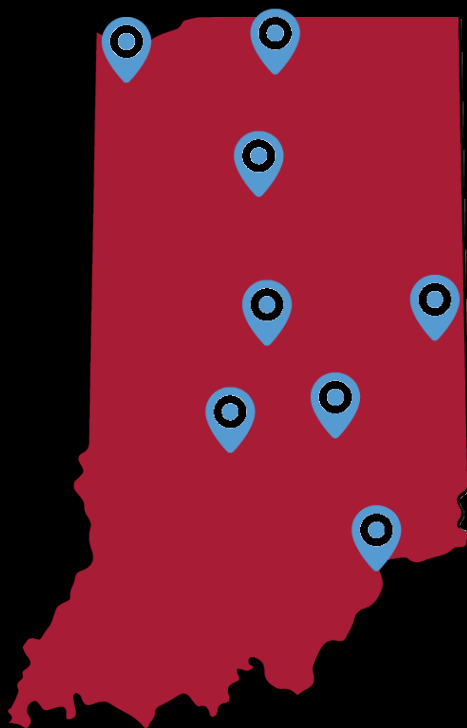
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Indiana University, *est. 1820*

- **\$3.3B** Enterprise
- Partnered with **\$6B** IU Health system
- **115,000** Students
- **1.3M** Credit Hours per semester
- **>20,000** Degrees per year
- **\$1.1B** In Financial Aid
- **\$450M** In research grants
- **8,000** Acres
- **882** Buildings, 36M square feet
- **>600,000** *Living* Alumni
- **10,500** Faculty and Staff



CENTRALIZED enterprise I.T.
with
DECENTRALIZED departmental I.T.

109 Departmental IT Groups
5213 Total Servers within IU

Safeguards

- IU I.T. Policy
 - IT-12 List of 'best practices' for system management
- IU Internal Audits
 - In depth departmental checks for IT operations
 - Alignment with IT policies
- Log management in IT-12
 - Success/Failed User Logons, Success/Failed File Accesses

Implications

- Costs associated with log review
 - Its overwhelming
 - ▶ Different log sources,
 - ▶ many servers
 - ▶ TONs of logs.
 - Costly if departments DIY
 - Staff time is at a premium
 - ▶ Admins can make much better use of your time being impactful to their departments



Multitenant

- Not just the security team logging in
- Useful and meaningful apps, but they don't all pertain to everyone

Cas/Shib

This Dashboard shows all information for Cas/Shib

CAS Tickets per month trending over the past year

2,365,071 Tickets -9,477,315

CAS Authentications for the last 12 months

8,838,078 Authentications

Shibboleth Authentications for the past 12 months

2,967,010 Authentications

Cas and Shib Authentications for the month



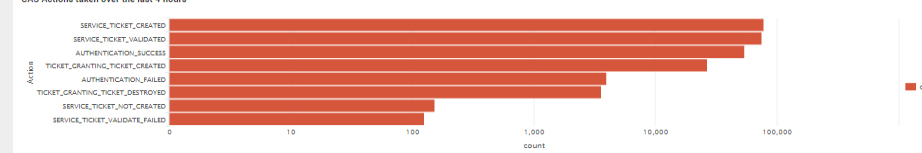
Failed Authentication Count by Location for the last 4 hours



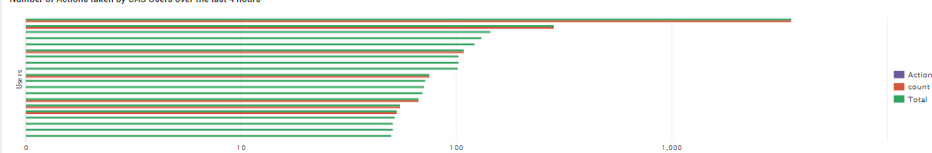
Failed Authentication Attempts in the Last 4 hours by Client IP

client_ip	City	Country	Region	lat	lon	count
192.168.1.1	Huntington	United States	Indiana	40.85310	-85.49950	25
192.168.1.2	Indianapolis	United States	Indiana	39.76840	-86.15800	12
192.168.1.3	Indianapolis	United States	Indiana	39.85540	-85.97380	12
192.168.1.4	Brick Township	United States	New Jersey	40.07070	-74.11080	11
192.168.1.5	Indianapolis	United States	Indiana	39.78510	-86.16650	9
192.168.1.6	Bloomington	United States	Indiana	39.24990	-86.43350	9
192.168.1.7	Indianapolis	United States	Indiana	39.82270	-86.14500	9
192.168.1.8	Nagerville	Uganda	Uganda	1.00000	32.00000	9
192.168.1.9	Indianapolis	United States	Indiana	41.77010	-85.14040	8
192.168.1.10	Indianapolis	United States	Indiana	39.80930	-86.10100	8

CAS Actions taken over the last 4 hours

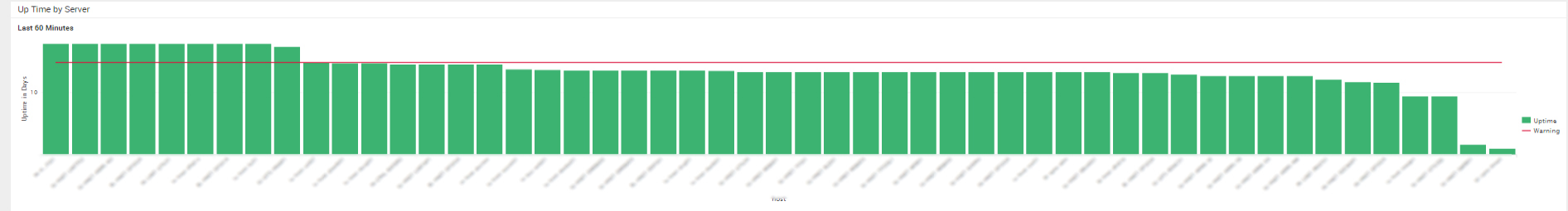
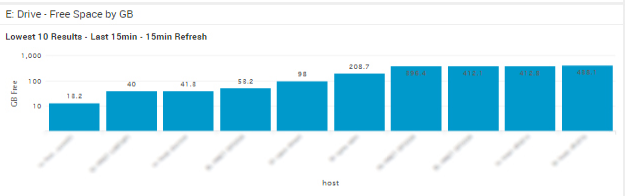
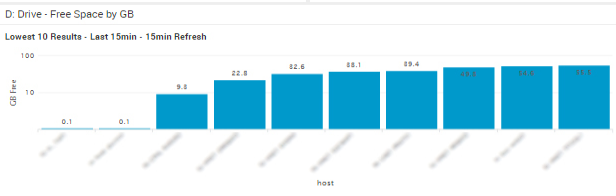
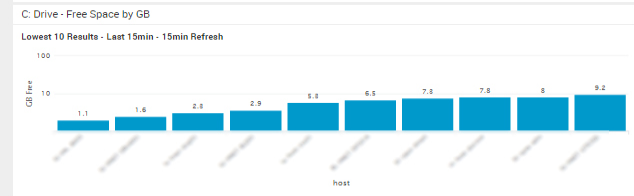
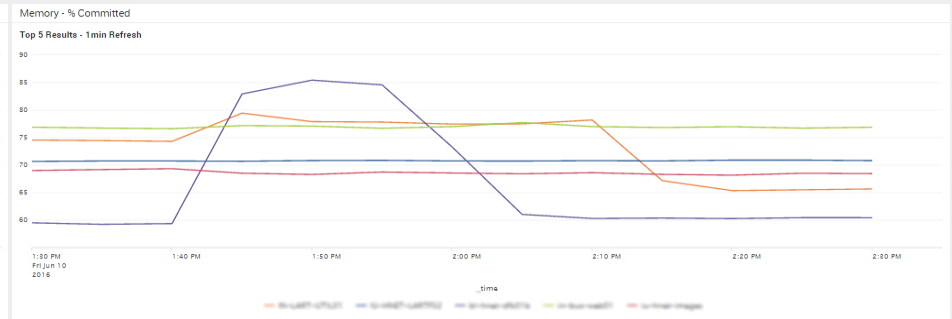
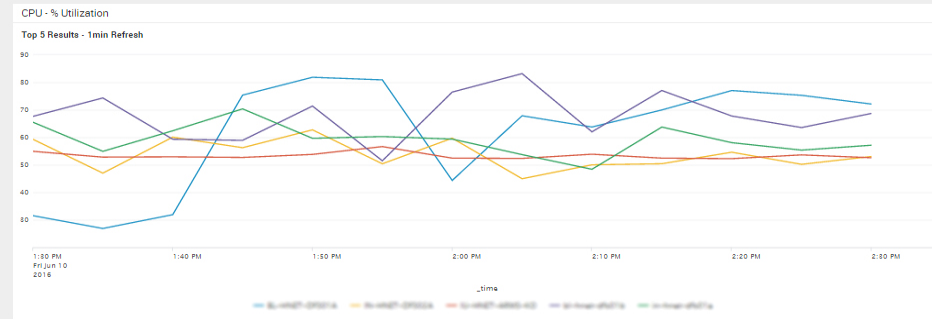


Number of Actions taken by CAS Users over the last 4 hours



HELPrnet IT Ops

Last 60 minutes



Antivirus Scan Status

By Status by Time

host	Time	Detail	Scan_Parameters	Scan_Time	Status
10.10.10.10	06/10/16 12:01:20	Microsoft Antimalware scan has started.	Quick Scan	0:01:05	Scan Started
10.10.10.10	06/10/16 12:01:28	Microsoft Antimalware scan has started.	Quick Scan	0:01:35	Scan Started
10.10.10.10	06/09/16 12:03:18	Microsoft Antimalware scan has finished.	Quick Scan	0:02:11	Successful
10.10.10.10	06/09/16 15:03:55	Microsoft Antimalware scan has finished.	Quick Scan	0:05:01	Successful

Antivirus Engine Status

By Status by Time

host	Time	Detail	Engine Version	Signature Version	Status
10.10.10.10	06/10/16 02:15:55	Microsoft Antimalware has encountered an error trying to update signatures. New Signature Version: Previous Signature Version: 1.233.1253.0 Update Source: Microsoft Update Server Update Stage: Search Source Path: http://www.microsoft.com/SignatureType: AntiVirus Update Type: Full User: NT AUTHORITY\SYSTEM Current Engine Version: Previous Engine Version: 1.1.12805.0 Error code: 0x80248014 Error description: An unexpected problem occurred while checking for updates.	1.1.12706.0	116.3.0.0	"FAILED UPDATE"
10.10.10.10	06/10/16	Microsoft Antimalware Configuration has changed. If this is an unexpected event you should review the settings as this may be the result of malware.	1.1.12805.0	1.023.1193.0	Configuration



- **Index Layer**

Read Access

- Limit searchable data based on index
- Role based configurations

Application Layer

Read/Write Access

Views

Reports

Eventtypes

Role Based Configurations

authentication.conf

```
[iuhelpnet01]
SSLEnabled = 1
anonymous_referrals = 1
bindDN =
bindDNpassword =
charset = utf8
emailAttribute = mail
groupBaseDN = groupMappingAttribute = distinguishedname
groupMemberAttribute = member
groupNameAttribute = cn
host =
nestedGroups = 1
network_timeout = 20
port = 636
realNameAttribute = displayname
sizelimit = 1000
timelimit = 15
userBaseDN =
userNameAttribute = samaccountname
```

```
[roleMap_iuhelpnet01]
test = IU-UIITS-SPLUNK-TEST
```


Role Based Configurations

authorize.conf

```
[role_test]
search = enabled
srchIndexesAllowed = _internal
srchIndexesDefault = _internal
srchJobsQuota = 8
srchDiskQuota = 250
accelerate_search = enabled
rest_properties_get = enabled
```

Index Layer Security Settings

authorize.conf

```
[role_test]
search = enabled
srchIndexesAllowed = _internal
srchIndexesDefault = _internal
srchJobsQuota = 8
srchDiskQuota = 250
accelerate_search = enabled
rest_properties_get = enabled
```

Capabilities

Select specific capabilities for this role.

Available capabilities

add all »

- accelerate_datamodel
- accelerate_search
- admin_all_objects
- change_authentication
- change_own_password
- delete_by_keyword
- edit_deployment_client

Selected capabilities

« clear all

- accelerate_search
- rest_properties_get
- schedule_rtsearch
- search

Indexes

Restrict this role's searches to the specified index(es). Search results for this role will only show events from these indexes.

Available search indexes

add all »

- All non-internal indexes
- All internal indexes
- _audit
- _internal
- _introspection
- _thefishbucket
- cas_summary
- firedalerts
- history
- iuhnet

Selected search indexes

« clear all

- _internal
- cas

Application Layer Settings

default.meta/local.meta

[]

access = **read** : [admin, hnet, splunk-system-role], **write** : [admin]

export = none

[reports]

access = **read** : [admin, hnet, splunk-system-role], **write** : [admin]

export = none

App permissions

Users with read access can only save objects for themselves, and require write access to be able to share objects with other users.

Roles	Read	Write
Everyone	<input checked="" type="checkbox"/>	<input type="checkbox"/>
admin	<input type="checkbox"/>	<input checked="" type="checkbox"/>
can_delete	<input type="checkbox"/>	<input type="checkbox"/>
cas	<input type="checkbox"/>	<input type="checkbox"/>
cne	<input type="checkbox"/>	<input type="checkbox"/>
cne-pci	<input type="checkbox"/>	<input type="checkbox"/>
denodo	<input type="checkbox"/>	<input type="checkbox"/>
hnet	<input type="checkbox"/>	<input type="checkbox"/>
iupc	<input type="checkbox"/>	<input type="checkbox"/>
iusb	<input type="checkbox"/>	<input type="checkbox"/>
iuse	<input type="checkbox"/>	<input type="checkbox"/>
kfs	<input type="checkbox"/>	<input type="checkbox"/>
nurs	<input type="checkbox"/>	<input type="checkbox"/>
power	<input type="checkbox"/>	<input checked="" type="checkbox"/>
splunk-system-role	<input type="checkbox"/>	<input type="checkbox"/>
test	<input type="checkbox"/>	<input type="checkbox"/>
user	<input type="checkbox"/>	<input type="checkbox"/>
windows-admin	<input type="checkbox"/>	<input type="checkbox"/>

Sharing for config file-only objects

Set permissions for configurations that have been copied over or added to config files rather than created through the UI. Objects defined in config files only (not in the UI) should appear in

This app only (system) All apps

Cancel

Save

Shortcomings Of Single Layer Security Within Splunk

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Limitations Of Only 1 Layer

Inclusive versus Exclusive

- Access to data pre
- Additional hoops t
- Users can intentio



urity loopholes
around the security

Show-Me State
Approved



F.B.I. T E R M I N A L



This is a secured and monitored Federal Government system. Unauthorized access is strictly prohibited. All activity is fully monitored. Individuals who attempt to gain unauthorized access or attempt any modification of information on this system is subject to criminal prosecution. All persons who are hereby notified that use of this system constitutes consent to monitoring and auditing.



IT-12

This Dashboard shows all information for IT-12

Edit ↓ ↓ ↓

Time Picker

Last 24 Hours [refresh] [dropdown]

All Successful Logins

No results found.

All Failed Logons

No results found.

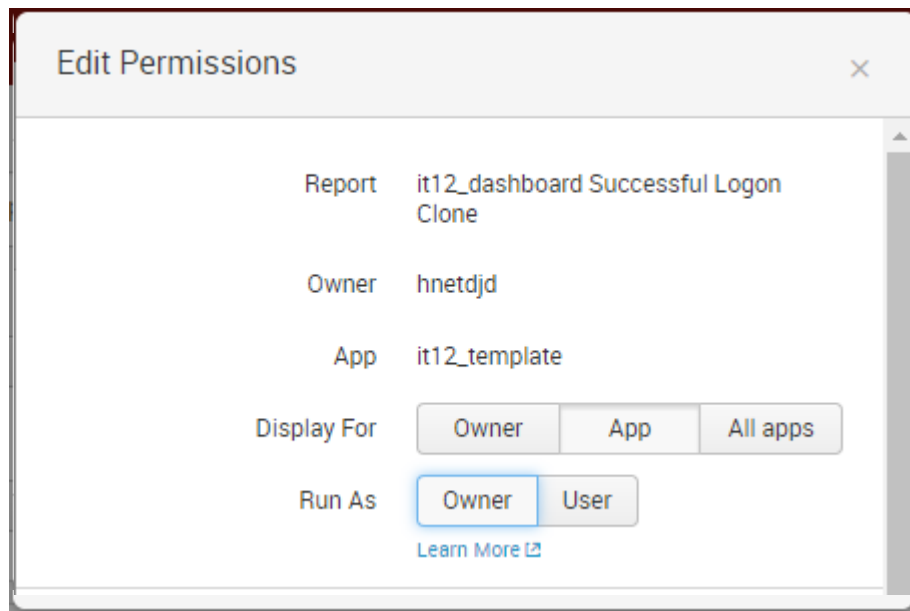
All Successful File Access By User

No results found.

All Failed File Access By User

No results found.

Saved Searches



Splunk Defaults Are Inclusive

```
dispatchAs = [user|owner]
```

- * When the saved search is dispatched via the "saved/searches/{name}/dispatch" endpoint, this setting controls, what user that search is dispatched as.
- * This setting is only meaningful for shared saved searches.
- * When dispatched as user it will be executed as if the requesting user owned the search.
- * When dispatched as owner it will be executed as if the owner of the search dispatched it no matter what user requested it.
- * Defaults to owner

ind

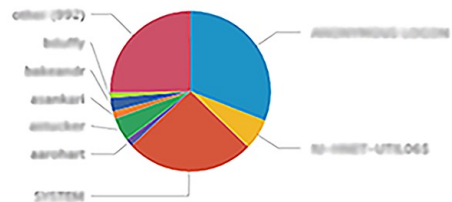
IT-12

This Dashboard shows all information for IT-12

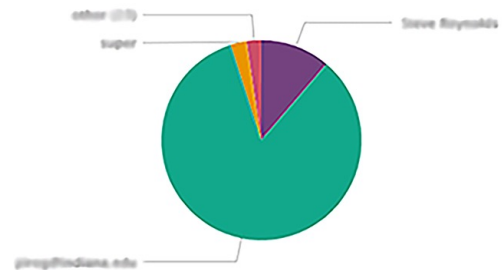
Time Picker

Last 24 Hours

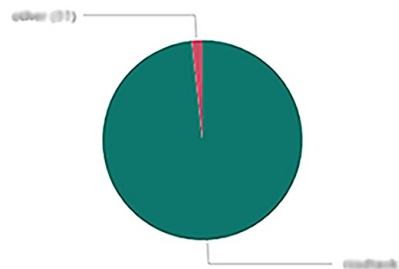
All Successful Logins



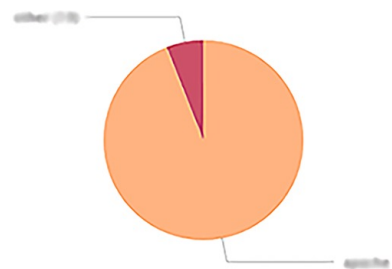
All Failed Logons



All Successful File Access By User



All Failed File Access By User



Application Layer Configuration

Authorize.conf

[role_test]

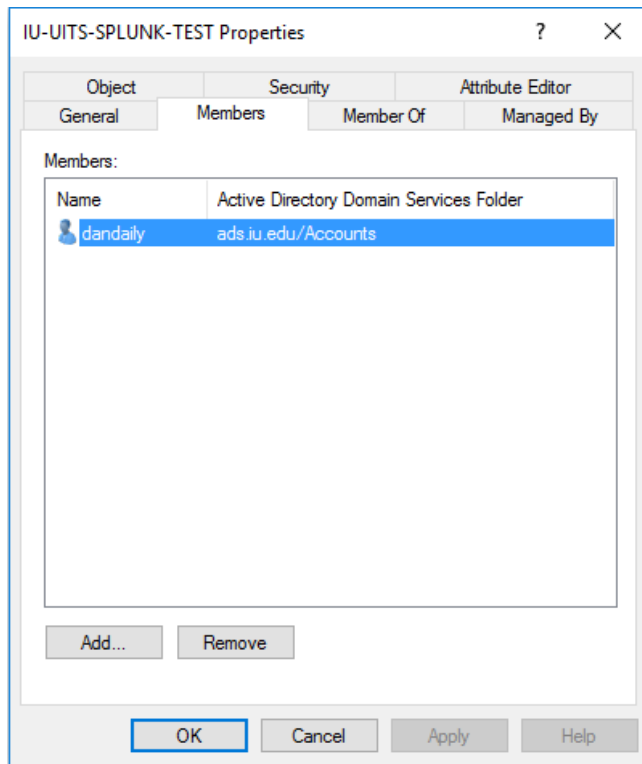
search = enabled

srchIndexesAllowed = *

Authentication.conf

[roleMap_iuhelpnet01]

test = IU-UIITS-SPLUNK-TEST





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Search Bar

Q Search

enter search here...

All time ▾

No Event Sampling ▾

Verbose Mode ▾

Rest API

```
curl -u 'dandaily' "https://localhost:8089/services/search/  
jobs/export?output_mode=json&search=search \"index  
%3D_internal|head\""
```

With Application
security alone...

Search bar and Rest API =



Security Best Practices For A Multitenant Environment

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Best Practices

Use single sign-on and/or Active Directory Authentications

Manage configurations through Deployer/Deployment server

Configure Dual Layer Security

Dual Security Layer Configuration

```
Authentication.conf
[roleMap_iuhelpnet01]
test = IU-UIITS-SPLUNK-TEST
```

```
Authorize.conf
[role_test]
srchIndexesAllowed = _internal
```

```
local.meta
[]
access = read : [ admin, test, splunk-system-role ],
write : [ admin ]
export = none
```

```
[reports]
access = read : [ admin, test, splunk-system-role ],
write : [ admin ]
export = none
```

Extra Security Options

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Additional Security

Scope access search bar via Application Security

Scope user capabilities through authorize.conf

Search Bar Access

Benefits:

Limits the number of searches ran in the environment

Easier to scale architecture

Limit poorly formed searches

App permissions

Users with read access can only save objects for themselves, and require write access to be able to share objects with other users.

Roles	Read	Write
Everyone	<input type="checkbox"/>	<input type="checkbox"/>
admin	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
can_delete	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Limit User Access

Authorize.conf

[role_hnet]

search = enabled

srchIndexesAllowed = iuhnet

srchIndexesDefault = iuhnet

srchJobsQuota = 12

srchDiskQuota = 750

rest_properties_get = enabled

accelerate_search = enabled

THANK YOU

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